1879MNRAS..39..167G

dation of mineral substances, does not counterbalance the amount continually being added to the atmosphere from meteors, together with the supplies derived from volcanic vents and from other sources from which the atmosphere may be recruited, it will be evident that the total amount of the atmosphere must either be increasing or decreasing. And the point to which I wish to draw attention is that such an increase or decrease would in time serve to account for great changes of temperature at the Earth's surface. If we suppose the Earth to pass through a region of space where there are comparatively few meteors, the height of the atmosphere would in the course of time be greatly decreased, and we should have a temperature at the sea level corresponding to the present temperature of our mountain-tops. In the language of geologists, a glacial epoch would be the result. If, on the other hand, the Earth passed through a region of space rich in meteors, containing occluded carbonic acid gas, the atmosphere would increase in depth, and a period like the carboniferous period might be the result, in which a semi-tropical vegetation might again flourish on the coast of Greenland.

Observations of the Transit of Mercury, May 6, 1878, *and of the Occultation of Mars by the Moon, June* 3, 1878, *made at the Glasgow Observatory.* By Professor R. Grant, Director of the Observatory.

Transit of Mercury.

Observed by Mr. Arthur Bowden, Principal Assistant. The instrument used was the Ochtertyre Equatoreal of 9 inches aperture, with a magnifying power of 240 applied. The external contact at ingress was lost. As the planet advanced upon the Sun's disk, the instant of the bisection of its disk by the Sun's limb was observed to occur at $3^h\ 12^m\ 31^s$ Greenwich Mean Time. The internal contact was well seen. It occurred at $3^h\ 14^m\ 15^s{\cdot}7$ Greenwich Mean Time. A bright spot was distinctly seen on the disk of the planet a little before contact. It was well defined and appeared of the same colour as the Sun. When the planet had wholly entered upon the Sun the spot did not appear so bright, but as the Sun was all the time covered by a thin cirrus of constantly varying density, the difference in brightness of the spot may have been attributable to that cause. No indication of a ligament was perceptible at the time of the planet's entrance upon the Sun's disk, but immediately after internal contact the limb of the planet exhibited an elongation or distortion towards the Sun's limb. This appearance continued visible for about ten seconds after contact. The bright spot was seen only once after the

Downloaded from http://mnras.oxfordjournals.org/ at University of Western Ontario on June 9, 2015

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

1879MNRAS..39..168Y

planet had advanced well on the Sun's disk. No appearance of a halo around the planet was visible, although the outline of the disk was carefully scanned, using in succession several magnifying powers.

Note by Professor Grant.—When the planet had wholly entered upon the Sun's disk I observed its appearance in the Ochtertyre Equatoreal. The disk was of a uniformly black colour and was exceedingly well defined. I failed to perceive any indication of the bright spot to which Mr. Bowden refers, nor could I discern the slightest trace of a nebulous ring around the planet.

Occultation of Mars by the Moon.

The phenomenon was observed by Professor Grant with the Ochtertyre Equatoreal, magnifying power 240. The final extinction of the planet's light occurred at $9^h\ 57^m\ 1^s$ Greenwich Mean Time. The reappearance was not seen.

Measures of the Diameter of Mercury made at the Princeton Observatory, May 6, 1878.

(*Communicated by Professor C. A. Young.*)

In a recent Number of the *Monthly Notices* (see vol. xxviii., p. 423) the result of a preliminary reduction of our observations was stated as $11''\cdot74$.

The rigorous reduction has changed this a little more than was anticipated, giving $11''\cdot705$ as the final result.

I had hoped to get a double-image micrometer in season for the Transit; but, failing to do so, adopted the method described below, which, so far as I know, is new and gives very satisfactory results.

The measures were made by bringing the image of the planet between two slightly converging bands or broad lines photographed on glass, and the observation consisted in noting the point where the disk exactly filled the interval between them. The bands were made nearly as wide as the planet, in order to neutralise irradiation. The plate upon which they were photographed was fitted into a micrometer in place of the usual spider-lines, and could be moved by the screw so as to bring any part of the plate to the centre of the field of view. The apparatus was attached to the Merz polarising eye-piece of the $9\frac{1}{2}$-inch Equatoreal, by which the intensity of the light could be graduated at pleasure. Powers of 150, 220, and 490 were used in the observations.

The arrangement of the reticule is indicated in the accompanying diagram, which, however, is not drawn to scale.

Downloaded from http://mnras.oxfordjournals.org/ at University of Western Ontario on June 9, 2015

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System